REMARKS

Claims 15-28 are now pending in the application. Claims 15, 17-19, 21, and 23-25 have been amended. Claims 27-33 have been added. Claims 1-14 have been previously cancelled.

Claim Rejections - 35 U.S.C. § 102

Claims 15-26 have been rejected under 35 USC 102(e) as being anticipated by Nomura (US 6,659,061).

First, Applicants would like to point out that the Examiner has generally rejected all the claims by verbally copying the claims language with no or very little explanation.

In order to facilitate the Examiner's understanding, Applicants would like to briefly review the present invention.

As described in paragraph [0003] of the specification of the instant application, the prior art balancing shaft has in its interior a balancing weight which extends virtually over its entire length and uses a pin, which projects through the balancing shaft, to fasten a balancing weight to the tubular part of the balancing shaft. This kind of fastening is very laborious because either the pin has to be locked from the interior or exterior of the balancing shaft. Also, this kind of balancing shaft is not suitable for local arrangement of the balancing weight. Further, the prior art balancing shaft will take up too much construction space in the engine when a large balancing weight is required because the diameter of the balancing shaft has to increase in order to accommodate the large balancing weight.

The object of the present invention is to provide a balancing shaft that overcomes the drawbacks of the prior art balancing shaft. More particularly, the object of the present invention is to provide a balancing shaft having an adequate balancing weight at the desired location of the

balancing shaft and a method for producing such a balancing shaft in the simplest possible manner. See paragraph [0004] of the specification of the instant application.

According to a preferred embodiment of the present invention, the balancing weight is connected to the outer circumstance of the balancing shaft in an interference fit or press fit. This achieves reliable fastening of the balancing weight with relatively simple means, without additional fastening elements. For achieving such an interference fit, for example thermal shrink fitting or magnetic forming and/or press-fitting of the balancing weight with an inside diameter of the hub of the balancing weight having an undersize relative to the outside diameter of the hollow body of the balancing shaft are conceivable. See paragraph [0008] of the specification of the instant application.

A specific example of how to form an interference fit is described in detail in paragraph [00020] of the specification in connection with the drawings of the instant application.

> *To produce the balancing shaft 1, first the bearing sleeve 7 and then the balancing weight 5 are pushed into the desired position. Whereas this is effected via the bore 11 of the bearing sleeve 7, the balancing weight 5 is integrally formed on a hub 12, as also illustrated in Fig. 2, so that the balancing weight 5 is pushed with the through-opening 13 of the hub 12 onto the hollow body 2. The bearing sleeve 7 and the balancing weight 5 are then connected to the hollow body 2, with an interference fit being formed. In this case, the bearing sleeve 7 and the balancing weight 5 can be connected to the hollow body 2 separately from one another or together with one another at the same time. The interference fit may be produced, for example, by broaching the hollow body 2. Here, however, the joining operation is to be advantageously executed by means of fluidic internal high pressure which is generated in the interior of the hollow body 2. A plurality of techniques are conceivable with regard to the internal high pressure joining. For example, the hollow body 2 with the pushed-on bearing sleeve 7 and the pushed-on balancing weight 5 can be inserted into an internal high pressure forming die, the die having the negative contour of the balancing shaft 1 outside the joints to be produced. At the location of the pushed-on joining members, i.e. the bearing sleeve 7 and the balancing weight 5, the die is designed in such a way that the joining members are mounted there with predetermined clearance. Finally, a fluidic internal high pressure is generated in the entire hollow body 2, and this fluidic internal high*

pressure plastically expands the hollow body 2 only at the joints, whereas no uncontrolled deformation of the hollow body 2 occurs outside the joints due to the contact of hollow body 2 with the impression of the forming die. Due to the plastic expanding of the hollow body 2, the outer circumference 4 of the hollow body 2 abuts against the wall of the through-opening 13 of the hub and also at the same time against the bore wall of the bearing sleeve 7. The hollow body 2 is now briefly expanded further, as a result of which the bearing sleeve 7 and the balancing weight 5 or the hub 12 are plastically expanded via the respective contact with said hollow body 2. After the pressure fluid inside the hollow body 2 is relieved, the material of the bearing sleeve 7 and of the hub 12 or of the balancing weight 5 springs back, whereas the hollow body 2 remains in its expanded plastic form. An extremely strong interference fit is produced in the process.

Nomura discloses an engine balancer having a balancer shaft 32 with two balance weights 33 and 34. The balance weight 33 is connected to the end of the balancer shaft 32 via a spine and is fixed to the end of the balancer shaft 32 by a nut 53 via a washer 52 (see col. 4, lines 25-29). The other balance weight 34 is integrated with the other end of the balancer shaft 32 (see col. 3, lines 59-60 as well as the abstract). It is not clear how Nomura discloses that the balancer weight is connected to the balancer shaft in an interference fit, wherein the hollow body (32) is plastically expanded only at the location of its connection to the balancing weight (33, 34), and the balancing weight (33, 34) is expanded at this location with elastic spring-back, as alleged by the Examiner.

As described above, the advantage of the present invention is that reliable fastening of the balancing weight with relatively simple means, without additional fastening elements, can be achieved. Since in Nomura the balance weight 33 is connected to the end of the balancer shaft 32 via a spine and is fixed to the end of the balancer shaft 32 by a nut 53 via a washer 52, additional fastening elements are required. Also, since in Nomura the balance weight 34 is integrated with the other end of the balancer shaft 32, no interference fit is formed.

Claims 15 and 21 are, therefore, believed to be patentable over Nomura and since all the dependent claims are ultimately dependent on claims 15 or 21, they are believed to be patentable

as well. Further, the dependent claims are believed to contain further patentable limitations because the Examiner has not indicated how each limitation in the dependent claims is disclosed by Nomura.

New claims 27-33 have been added. The support for these claims may be found, for example, on paragraphs [00015] and [00020] of the specification. Claims 27-33 are believed to be patentable because they contain further patentable limitations as well as because they are dependent of independent claims 15 or 21, which are believed to be patentable as discussed above.

The Commissioner is hereby authorized to charge any fees which may be required at any time during the prosecution of this application without specific authorization, or credit any overpayment, to Deposit Account Number 50-0951.

Favorable consideration and early issuance of the Notice of Allowance are respectfully requested. **Should further issues remain prior to allowance, the Examiner is respectfully requested to contact the undersigned at the indicated telephone number.**

Respectfully submitted,

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